

I claim:

1. An ionically conductive ceramic element comprising: 40
a plurality of tubes each having interior and exterior
surfaces, and each having a closed end and an open
end;

a tube support member receiving open ends of said
plurality of tubes; 45

a first electrically conductive coating covering said exte-
rior surfaces of said plurality of tubes;

a second electrically conductive coating covering said
interior surfaces of said plurality of tubes; and 50

said ionically conductive ceramic element having at least
two columns and a first electrode covering an exterior
surface of said first column and an interior surface of
said second column of tubes and a second electrode
covering an exterior surface of said second column of 55
tubes and an interior surface of said first column of
tubes;

said first electrode being connectable to a source of
electrical potential at a first polarity and said second
electrode being connectable to a source of electrical 60
potential at a second polarity.

2. The ceramic element described in claim 1 wherein said
plurality of tubes are formed into rows and columns on said
tube support member wherein each tube is connected to said
first electrode and said second electrode and first and second
electrode portions of each of said tubes in a column are
electrically connected in parallel and wherein each of the
tubes forming a row are electrically connected in series.

3. The ceramic element described in claim 2 wherein said
5 first and second electrodes are formed by

cuts in said first and second electrically conductive coat-
ings between said columns of tubes, said cuts extending
longitudinally of and between the columns of tubes so
that the portions of said first and second electrodes on
10 opposite sides of each said cut are electrically
separated, vias extended through said first and second
surfaces adjacent each of said tubes and

15 electrical connections extending through said vias con-
necting a first electrode portion of each said tube in a
row to a second electrode portion of a tube in an
adjacent column in the same row to form a series
connection across each row of tubes.

4. The ceramic element described in claim 3 wherein said
20 electrical connections are constituted by the material form-
ing said first and second electrodes coating the surfaces of
said ceramic electrolyte extending through said vias.

5. The ceramic element described in claim 1, wherein
25 each the plurality of tubes is spaced from adjacent tubes.

6. An oxygen generator, comprising:

a first ceramic element having a tube support member and
an array of tube members extending from said tube
support member and formed into columns and rows;

30 a second ceramic element adjacent said first ceramic
element; and

a seal between said first ceramic element and said second
ceramic element;

35 said first ceramic element having at least two columns and
a first electrode covering an exterior surface of said first
column and an interior surface of said second column
of tubes and a second electrode covering an exterior
surface of said second column of tubes and an interior
surface of said first column of tubes;

40 said first electrode being connectable to a source of
electrical potential at a first polarity and said second
electrode being connectable to a source of electrical
potential at a second polarity.

45 7. The oxygen generator of claim 6, wherein said first
ceramic element includes a first electrically conductive
coating covering exterior surfaces of each of said plurality of
tube members; and

50 wherein said first ceramic element includes a second
electrically conductive coating covering interior sur-
faces of said plurality of tube members.

8. The oxygen generator of claim 6, wherein said first
ceramic element is integrally formed.

9. An electrochemical element, comprising:

55 a ceramic element having a tube support member and an
array of tube members extending from said tube sup-
port member;

wherein said tube support member and said array of tube
members are formed from ceramic.

60 10. The electrochemical element of claim 9, wherein said
ceramic element is an electrolyte.

11. The electrochemical element of claim 9, wherein said
ceramic element is integrally formed.

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